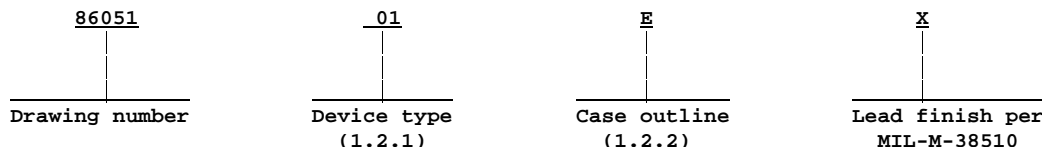


REVISIONS																			
LTR	DESCRIPTION										DATE (YR-MO-DA)					APPROVED			
A	Update vendor's part number. Change to military drawing format. Editorial changes throughout.										1987 JULY 7					M. A. Frye			
B	Made technical changes to table I. Added device types 07, 08, and 09 for vendor CAGE 34335. Changes to figures 4, 5, 6. Changes to 4.3.2 and 6.4. Corrected CAGE code on front page. Editorial changes throughout.										1989 JUNE 13					M. A. Frye			
CURRENT CAGE CODE 67268																			
REV																			
SHEET																			
REV	B																		
SHEET	15																		
REV STATUS OF SHEETS				REV		B	B	B	B	B	B	B	B	B	B	B	B	B	B
				SHEET		1	2	3	4	5	6	7	8	9	10	11	12	13	14
PMIC N/A				PREPARED BY Steve Duncan						DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444									
<b>STANDARDIZED MILITARY DRAWING</b>  THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE  AMSC N/A				CHECKED BY Ray Monnin															
				APPROVED BY Michael A. Frye															
				DRAWING APPROVAL DATE 25 MARCH 1986															
				REVISION LEVEL  B						SIZE <b>A</b>	CAGE CODE <b>14933</b>	<b>86051</b>							
SHEET										1	OF	15							

# 1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part number. The complete part number shall be as shown in the following example:



1.2.1 Device types. The device types shall identify the circuit function as follows:

Device type	Generic number	Circuit	Access time
01	27S02	64-Bit Schottky bipolar RAM, open collector outputs	50
02	27S02A	64-Bit Schottky bipolar RAM, open collector outputs	30
03	27LS02	64-Bit Low power schottky bipolar RAM, open collector outputs	65
04	27S03	64-Bit Schottky bipolar RAM, three-state outputs	50
05	27S03A	64-Bit Schottky bipolar RAM, three-state outputs	30
06	27LS03	64-Bit Low power schottky bipolar RAM, three-state outputs	65
07	27S02-20	64-Bit Schottky bipolar RAM, open collector outputs	20
08	27S03-20	64-Bit Schottky bipolar RAM, three-state outputs	20
09	27LS03-30	64-Bit Low power Schottky bipolar RAM, three-state outputs	30

1.2.2 Case outlines. The case outlines shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letter	Case outline
E	D-2 (16-lead, .840" x .310" x .200"), dual-in-line package
F	F-5 (16-lead, .440" x .285" x .085"), flat package
2	C-2 (20-terminal, .358" x .358" x .100"), square chip carrier package

## 1.3 Absolute maximum ratings.

Supply voltage range - - - - -	-0.5 V dc to +7.0 V dc
Input voltage range- - - - -	-0.5 V dc to +5.5 V dc
Storage temperature range- - - - -	-65°C to +150°C
Maximum power dissipation ( $P_D$ ) $\frac{1}{-}$ - - - - -	1.6 W
Lead temperature (soldering, 10 seconds) - - - - -	+300°C
Thermal resistance, junction-to-case ( $\theta_{JC}$ ):	
Cases E, F and 2 - - - - -	See MIL-M-38510, appendix C
Junction temperature ( $T_J$ )- - - - -	+175°C
DC input current - - - - -	-30 mA to +5 mA

$\frac{1}{-}$  Must withstand the added  $P_D$  due to short circuit test; e.g.,  $I_{OS}$ .

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>		86051
		REVISION LEVEL B	SHEET 2

1.4 Recommended operating conditions.

Supply voltage range ( $V_{CC}$ )	- - - - -	4.5 V dc minimum to 5.5 V dc maximum
Minimum high-level input voltage ( $V_{IH}$ )	- - - - -	2.0 V dc
Maximum low-level input voltage ( $V_{IL}$ )	- - - - -	0.8 V dc
Case operating temperature range ( $T_C$ )	- - - - -	-55°C to +125°C

2. APPLICABLE DOCUMENTS

2.1 Government specification and standard. Unless otherwise specified, the following specification and standard, of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Copies of the specification and standard required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.2 Truth table. The truth table shall be as specified on figure 2.

3.2. Logic diagram. The logic diagram shall be as specified on figure 3.

3.2. Case outlines. The case outlines shall be in accordance with 1.2.2 herein.

3.3 Electrical performance characteristics. Unless otherwise specified, the electrical performance characteristics are as specified in table I and apply over the full case operating temperature range.

3.4 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in 6.4 herein.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		86051
		REVISION LEVEL B	SHEET 3

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C 4.5 V dc ≤ V <sub>CC</sub> ≤ 5.5 V dc unless otherwise specified		Group A sub- groups	Device type	Limits		Unit
						Min	Max	
Output high voltage	V <sub>OH</sub>	V <sub>CC</sub> = min. V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> = -2.0 mA	1,2,3	ALL	2.4		V
Output low voltage	V <sub>OL</sub>	V <sub>CC</sub> = min. V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 16 mA	1,2,3	01,02, 04,05, 07,08		450	mV
			I <sub>OL</sub> = 20 mA		01,02, 04,05, 07,08		500	
			I <sub>OL</sub> = 10 mA		03,06, 09		500	
			I <sub>OL</sub> = 8 mA		03,06, 09		450	
Input high level voltage	V <sub>IH</sub>	Guaranteed input logical high <u>1</u> / voltage for all inputs		1,2,3	All	2.0		V
Input low level voltage	V <sub>IL</sub>	Guaranteed input logical low <u>1</u> / voltage for all inputs		1,2,3	All		0.8	V
Input low current	I <sub>IL</sub>	V <sub>CC</sub> = max V <sub>IN</sub> = 0.40 V	WE, D <sub>0</sub> -D <sub>3</sub> , A <sub>0</sub> -A <sub>3</sub> , CS	1,2,3	All		-250	μA
Input high current	I <sub>IH</sub>	V <sub>CC</sub> = max, V <sub>IN</sub> = 2.7 V		1,2,3	All		10	μA
Output short circuit current	I <sub>OS</sub>	V <sub>CC</sub> = max V <sub>OUT</sub> = 0.0 V <u>2</u> /		1,2,3	ALL	-20	-90	mA
Power supply current	I <sub>CC</sub>	All inputs = GND V <sub>CC</sub> = max		1,2,3	01,02, 04,05, 07,08		105	mA
					03,06, 09		38	
Input clamp voltage	V <sub>CL</sub>	V <sub>CC</sub> = min, I <sub>IN</sub> = -18 mA		1,2,3	All		-1.2	V

See footnotes at end of table.

STANDARDIZED  
MILITARY DRAWING  
DEFENSE ELECTRONICS SUPPLY CENTER  
DAYTON, OHIO 45444

SIZE  
**A**

86051

REVISION LEVEL  
B

SHEET  
4

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C 4.5 V dc ≤ V <sub>CC</sub> ≤ 5.5 V dc unless otherwise specified	Group A sub- groups	Device type	Limits		Unit
					Min	Max	
Output leakage current	I <sub>CEX</sub>	V <sub>CS</sub> = V <sub>IH</sub> or V <sub>WE</sub> = V <sub>IL</sub> V <sub>OUT</sub> = 2.4 V	1,2,3	All		40	μA
		V <sub>CS</sub> = V <sub>IH</sub> or V <sub>WE</sub> = V <sub>IL</sub> V <sub>OUT</sub> = 0.4 V		ALL	-40		
Delay from address to output	t <sub>PLH(A)</sub> t <sub>PHL(A)</sub>	See figures 4 and 6 <u>3/</u>	9,10,11	01,04		50	ns
				02,05		30	
				09			
				03,06		65	
				07,08		20	
Delay from chip select (LOW) to active out- put and correct data	t <sub>PZH(CS)</sub> t <sub>PZL(CS)</sub>	See figures 4 and 6 <u>4/ 5/</u>	9,10,11	01,04		25	ns
				02,05,		20	
				07,08,			
				09			
Delay from write enable (HIGH) to active out- put and correct data (write recovery) <u>6/</u>	t <sub>PZH(WE)</sub> t <sub>PZL(WE)</sub>	See figures 4 and 5 <u>4/ 5/</u>	9,10,11	01,04		40	ns
				02,05		25	
				03,06		35	
				07,08,		15	
				09			
Setup time address (prior to initiation of write)	t <sub>S(A)</sub>	See figures 4 and 5	9,10,11	All	0		ns
Hold time address (after termination of write)	t <sub>H(A)</sub>	See figures 4 and 5	9,10,11	All	0		ns
Setup time data input (prior to termination of write)	t <sub>S(DI)</sub>	See figures 4 and 5	9,10,11	09	30		ns
				01,02,	25		
				04,05			
				03,06	55		
Hold time data input (after termination of write)	t <sub>H(DI)</sub>	See figures 4 and 5	9,10,11	07,08	20		ns
				All	0		

See footnotes at end of table.

STANDARDIZED  
MILITARY DRAWING  
DEFENSE ELECTRONICS SUPPLY CENTER  
DAYTON, OHIO 45444

SIZE  
**A**

86051

REVISION LEVEL  
B

SHEET  
**5**

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C 4.5 V dc ≤ V <sub>CC</sub> ≤ 5.5 V dc unless otherwise specified	Group A sub- groups	Device type	Limits		Unit
					Min	Max	
Min write enable pulse width to insure write	$t_{pw(WE)}$	See figures 4 and 5	9,10,11	09	30		ns
				01,02, 04,05	25		
				03,06	55		
				07,08	20		
Delay from chip select (HIGH) to inactive output (HI-Z)	$t_{PHZ(CS)}$ $t_{PLZ(CS)}$	See figures 4 and 6 <u>4</u> / <u>5</u> /	9,10,11	01,04, 09		25	ns
				02,05, 07,08		20	
				03,06		35	
Delay from write enable (LOW) to inactive output (HI-Z)	$t_{PLZ(WE)}$ $t_{PHZ(WE)}$	See figures 4 and 5 <u>4</u> / <u>5</u> /	9,10,11	01,03, 04,06		35	ns
				02,05, 09		25	
				07,08		20	

- 1/ These are absolute voltages with respect to device ground pin and include all overshoots due to system and/or tester noise. Do not attempt to test these values without suitable equipment.
- 2/ Not more than one output should be shorted at a time. Duration of the short circuit should not be more than one second.
- 3/ Parameters  $t_{PLH(A)}$  and  $t_{PHL(A)}$  are tested with S1 closed and CL = 30 pF with both input and output timing referenced to 1.5 V.
- 4/ For open collector, all delays from Write Enable (WE) or Chip Select (CS) inputs to the Data Output (D<sub>OUT</sub>),  $t_{PLZ(WE)}$ ,  $t_{PLZ(CS)}$ ,  $t_{PZH(WE)}$ , and  $t_{PZH(CS)}$  are measured with S1 closed and CL = 30 pF; and with both the input and output timing referenced to 1.5 V.
- 5/ For 3-state output,  $t_{PZH(WE)}$  and  $t_{PZH(CS)}$  are measured with S1 open, CL = 30 pF and with both the input and output timing referenced to 1.5 V. Parameters  $t_{PZL(WE)}$  and  $t_{PZL(CS)}$  are measured with S1 closed, CL = 30 pF and with both the input and output timing referenced to 1.5 V. Parameters  $t_{PHZ(WE)}$  and  $t_{PHZ(CS)}$  are measured with S1 open and CL < 5 pF and are measured between the 1.5 V level on the input and the V<sub>OH</sub> = -500 mV level on the output. Parameters  $t_{PLZ(WE)}$  and  $t_{PLZ(CS)}$  are measured with S1 closed CL ≤ 5 pF and are measured between the 1.5 V level on the input and the V<sub>OL</sub> = +500 mV level on the output.
- 6/ Output is preconditioned to data in (inverted) during write to ensure correct data is present on all outputs when write is terminated. (No write recovery glitch).

STANDARDIZED  
MILITARY DRAWING  
DEFENSE ELECTRONICS SUPPLY CENTER  
DAYTON, OHIO 45444

SIZE  
**A**

**86051**

REVISION LEVEL  
**B**

SHEET  
**6**

3.5 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in 6.4. The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall state that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.6 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.7 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.8 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2)  $T_A = +125^{\circ}\text{C}$ , minimum.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

##### 4.3.1 Group A inspection.

a. Tests shall be as specified in table II herein.

b. Subgroups 5 and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroup 4 ( $C_{IN}$  and  $C_{OUT}$  measurements) shall be measured only for the initial process or design changes which may affect capacitance. Sample size is 15 devices with no failures, and all input and output terminals tested.

<p>STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444</p>	<p>SIZE <b>A</b></p>		<p><b>86051</b></p>
		<p>REVISION LEVEL B</p>	<p>SHEET <b>7</b></p>

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	---
Final electrical test parameters (method 5004)	1*,2,3,7,8,9, 10**,11**
Group A test requirements (method 5005)	1,2,3,4***,7,8, 9,10**,11**
Groups C and D end-point electrical parameters (method 5005)	1,2,3

\* PDA applies to subgroup 1.

\*\* Subgroups 10 and 11, if not tested, shall be  
guaranteed to the specified limits in table I.

\*\*\* For subgroup 4 see 4.3.1c.

#### 4.3.2 Groups C and D inspections.

a. End-point electrical parameters shall be as specified in table II herein.

b. Steady-state life test conditions, method 1005 of MIL-STD-883.

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance  
(see 3.5 herein).

(2)  $T_A = +125^{\circ}\text{C}$ , minimum.

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

#### 5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

#### 6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

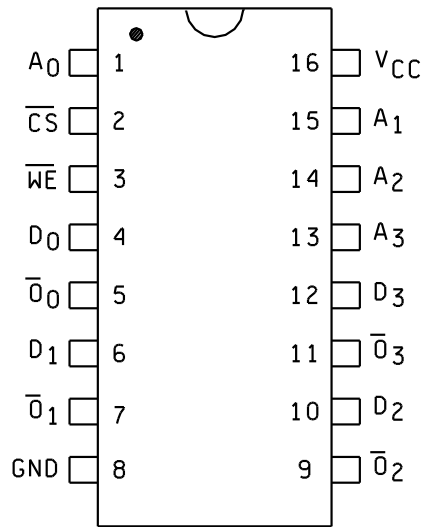
6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone 513-296-5375.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>		<b>86051</b>
		REVISION LEVEL B	SHEET <b>8</b>



# CASES E AND F



# CASE 2

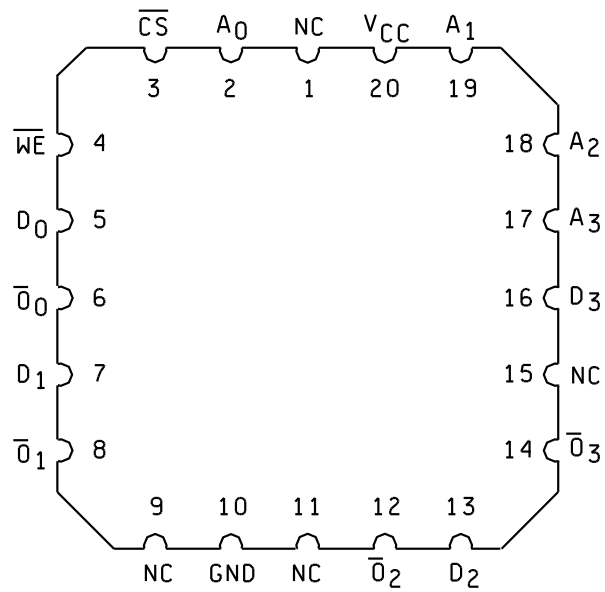


FIGURE 1. Terminal connections.

STANDARDIZED  
MILITARY DRAWING  
DEFENSE ELECTRONICS SUPPLY CENTER  
DAYTON, OHIO 45444

SIZE  
**A**

86051

REVISION LEVEL  
B

SHEET  
9

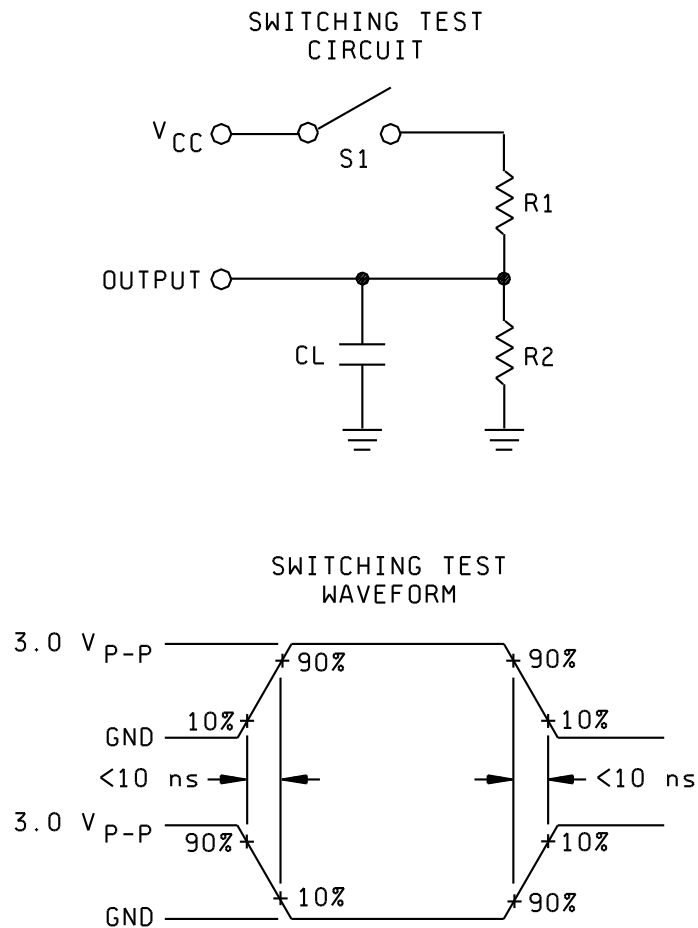
Input		Data output status 0 <sub>0</sub> -0 <sub>3</sub>	Mode
$\overline{\text{CS}}$	$\overline{\text{WE}}$		
L	L	Output disabled	Write
L	H	Selected word (inverted)	Read
H	X	Output disabled	Deselect

H = HIGH  
 L = LOW  
 X = Don't Care

FIGURE 2. Truth table.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>		<b>86051</b>
		REVISION LEVEL B	SHEET <b>10</b>





Device	R1	R2
01, 02 04, 05 07, 08	300 $\Omega$	600 $\Omega$
03, 06 09	600 $\Omega$	1200 $\Omega$

FIGURE 4. Switching test circuit and waveform.

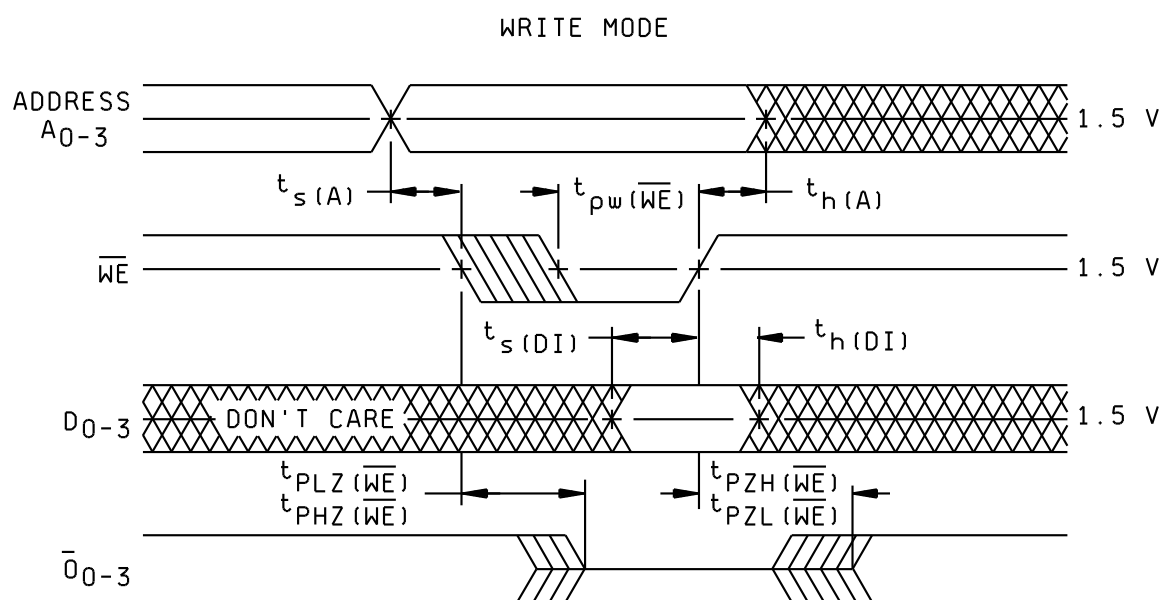
STANDARDIZED  
MILITARY DRAWING  
DEFENSE ELECTRONICS SUPPLY CENTER  
DAYTON, OHIO 45444

SIZE  
**A**

**86051**

REVISION LEVEL  
B

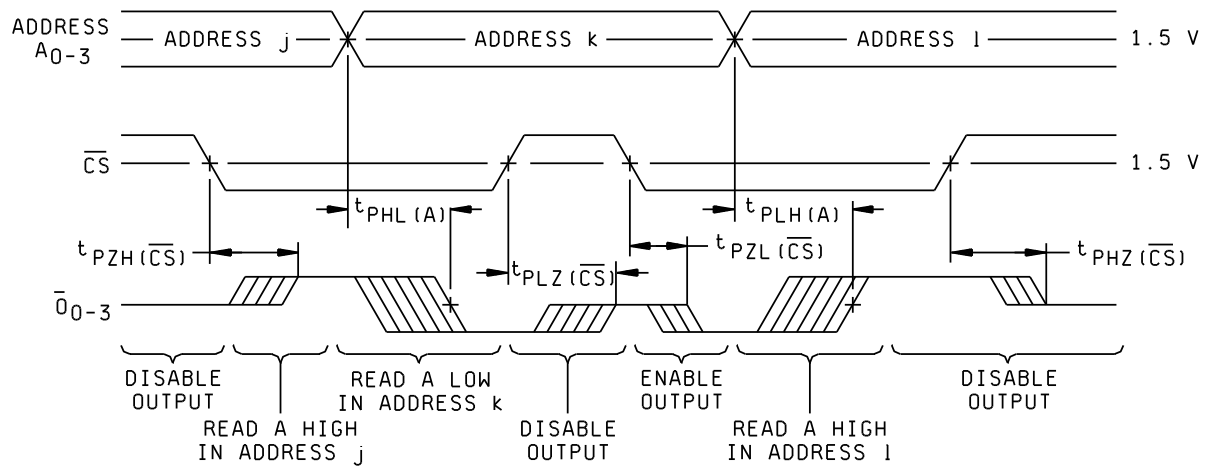
SHEET  
**12**



NOTE: Write cycle time. The cycle is initiated by an address change. After  $t_{s(A)}$  minimum the write enable may begin. The chip select must also be LOW for writing. Following the write pulse,  $t_{h(A)}$  minimum must be allowed before the address may be changed again. The output will be inactive (floating for the O4, O5, O6, O8, and O9) while the write enable is LOW.

FIGURE 5. Write mode switching waveform.

<b>STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444</b>	<b>SIZE A</b>		<b>86051</b>
		<b>REVISION LEVEL B</b>	<b>SHEET 13</b>



NOTE: Switching delays from address and chip select inputs to the data output. For the 04, 05, 06, 08, and 09 device types disabled output is "OFF", represented by a single center line. For the 01, 02, 03, and 07 device types a disable output is HIGH.

FIGURE 6. Read mode switching waveform.

STANDARDIZED  
MILITARY DRAWING  
DEFENSE ELECTRONICS SUPPLY CENTER  
DAYTON, OHIO 45444

SIZE  
A

86051

REVISION LEVEL  
B

SHEET  
14

6.4 Approved source of supply. An approved source of supply is listed herein. Additional sources will be added as they become available. The vendor listed herein has agreed to this drawing and a certificate of compliance (see 3.5) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number <u>1/</u>
8605101EX 8605101FX 86051012X	34335 34335 34335	AM27S02/BEA AM27S02/BFA AM27S02/B2A
8605102EX 8605102FX 86051022X	34335 34335 34335	AM27S02A/BEA AM27S02A/BFA AM27S02A/B2A
8605103EX 8605103FX 86051032X	<u>2/</u> <u>2/</u> <u>2/</u>	AM27LS02/BEA AM27LS02/BFA AM27LS02/B2A
8605104EX 8605104FX 86051042X	34335 34335 34335	AM27S03/BEA AM27S03/BFA AM27S03/B2A
8605105EX 8605105FX 86051052X	34335 34335 34335	AM27S03A/BEA AM27S03A/BFA AM27S03A/B2A
8605106EX 8605106FX 86051062X	34335 34335 34335	AM27LS03/BEA AM27LS03/BFA AM27LS03/B2A
8605107EX 8605107FX 86051072X	34335 34335 34335	AM27S02-20/BEA AM27S02-20/BFA AM27S02-20/B2A
8605108EX 8605108FX 86051082X	34335 34335 34335	AM27S03-20/BEA AM27S03-20/BFA AM27S03-20/B2A
8605109EX 8605109FX 86051092X	34335 34335 34335	AM27LS03-30/BEA AM27LS03-30/BFA AM27LS03-30/B2A

1/ CAUTION. Do not use this number for item acquisition.  
Items acquired to this number may not satisfy the  
performance requirements of this drawing.

2/ Not available from approved source.

Vendor CAGE  
number

34335

Vendor name  
and address

Advanced Micro Devices, Incorporated  
901 Thompson Place  
P.O. Box 3453  
Sunnyvale, CA 94088

STANDARDIZED  
MILITARY DRAWING  
DEFENSE ELECTRONICS SUPPLY CENTER  
DAYTON, OHIO 45444

SIZE  
**A**

REVISION LEVEL  
B

**86051**

SHEET  
**15**